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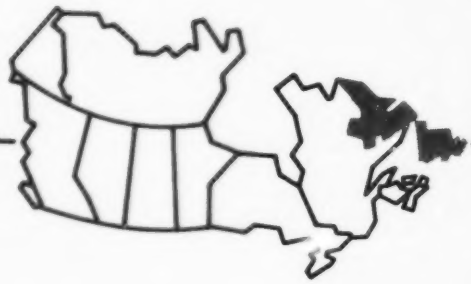
Forest insect and disease conditions in Newfoundland and Labrador in 1985

L. J. Clarke and G. C. Carew



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Newfoundland Forestry Centre

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by L.J. Clarke and G.C. Carew

INFORMATION REPORT N-X-241
1986

CANADIAN FORESTRY SERVICE
NEWFOUNDLAND FORESTRY CENTRE

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Newfoundland Forestry Centre
Canadian Forestry Service
P.O. Box 6028,
St. John's, Newfoundland
Canada A1C 5X8

Telephone No. 709-772-4117

ABSTRACT

This report summarizes forest pest conditions in Newfoundland and Labrador in 1985 and was compiled from information collected in 12 forest insect and disease survey Districts. Major pests of fir, spruce, pine and larch forests and deciduous tree species are discussed in detail and pests of lesser importance are tabulated.

RÉSUMÉ

Ce rapport est un résumé de la situation des ravageurs forestiers à Terre-Neuve et au Labrador en 1985. Les renseignements qu'il contient proviennent du relevé des insectes et des maladies des arbres effectué dans 12 districts. Les ravageurs des forêts de sapin d'épinette, de pin et de mélèze et ceux des espèces feuillues font l'objet d'un exposé détaillé et les les ravagers de moindre importance sont présentés sous forme de tableau.

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by

L.J. Clarke and G.C. Carew

INTRODUCTION

This report summarizes forest insect and disease conditions in the forests of Newfoundland and Labrador in 1985 and forecasts conditions in 1986. The region is divided into 12 ranger districts with four rangers responsible for detecting, monitoring and collecting forest pests, maintaining records and conducting surveys to support forest research and providing advisory services on forest pest and disease conditions to governments, industry and the general public. The information in this report was compiled from the observation and field records of the district rangers and other survey personnel. The Forest Insect and Disease Survey Districts and the Provincial Forest Management Units are included for reference (Figs. 1 and 2).

SUMMARY

The most destructive insects and diseases in the Province in 1985 were the eastern hemlock looper, balsam woolly aphid, spruce budworm, four-eyed spruce bark beetle and larch sawfly. New species collected for the first time in the province were a leafroller, Pandemis heparana and a webworm Crambus pascuellus.

The birch casebearer, white-marked tussock moth, birch leafminer and striped alder sawfly caused the most damage of hardwoods in several areas on the Island. The mountain ash sawfly and satin moth caused severe damage to ornamental trees in many residential areas.

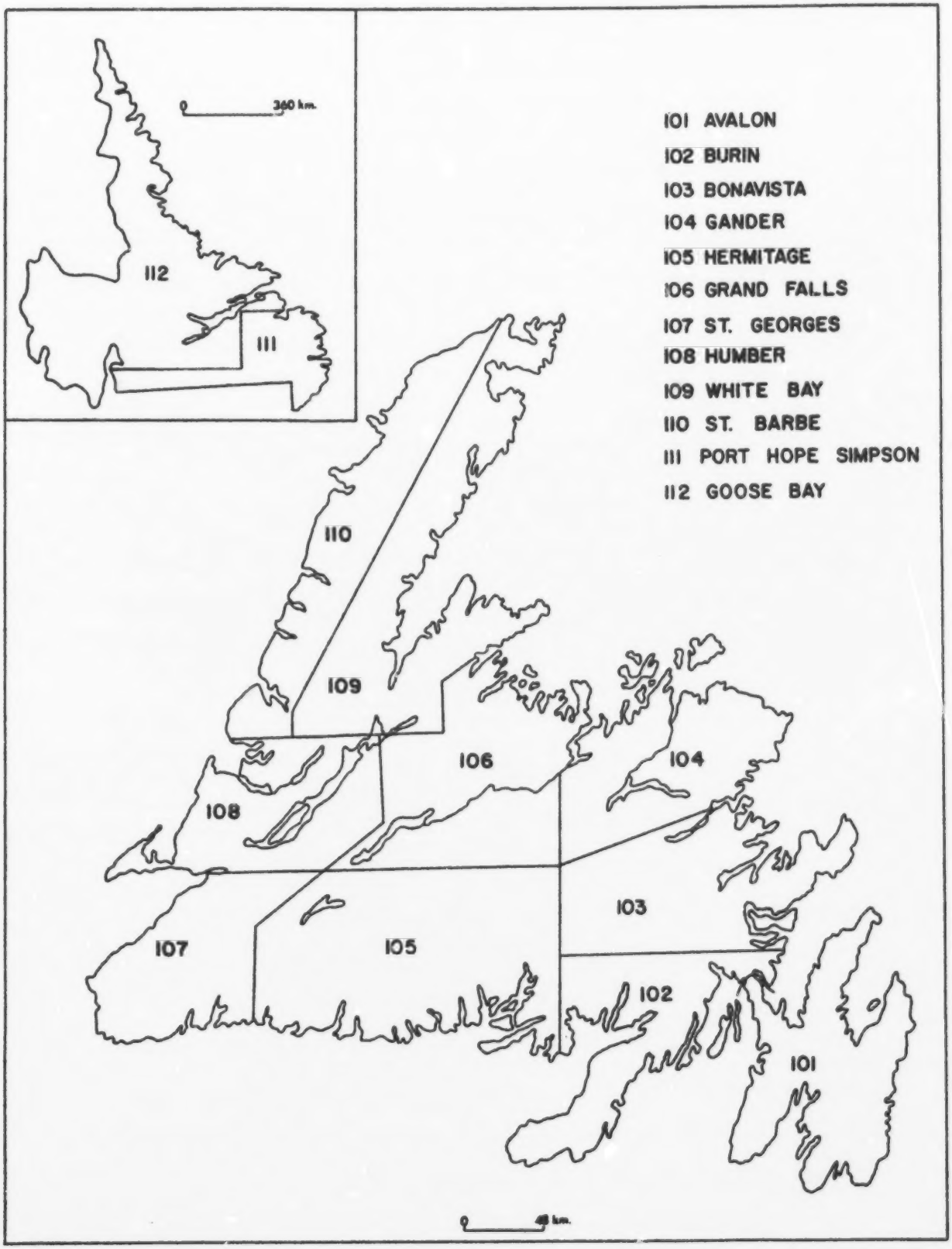

Fig. 1. Forest Insect and Disease Survey Districts.

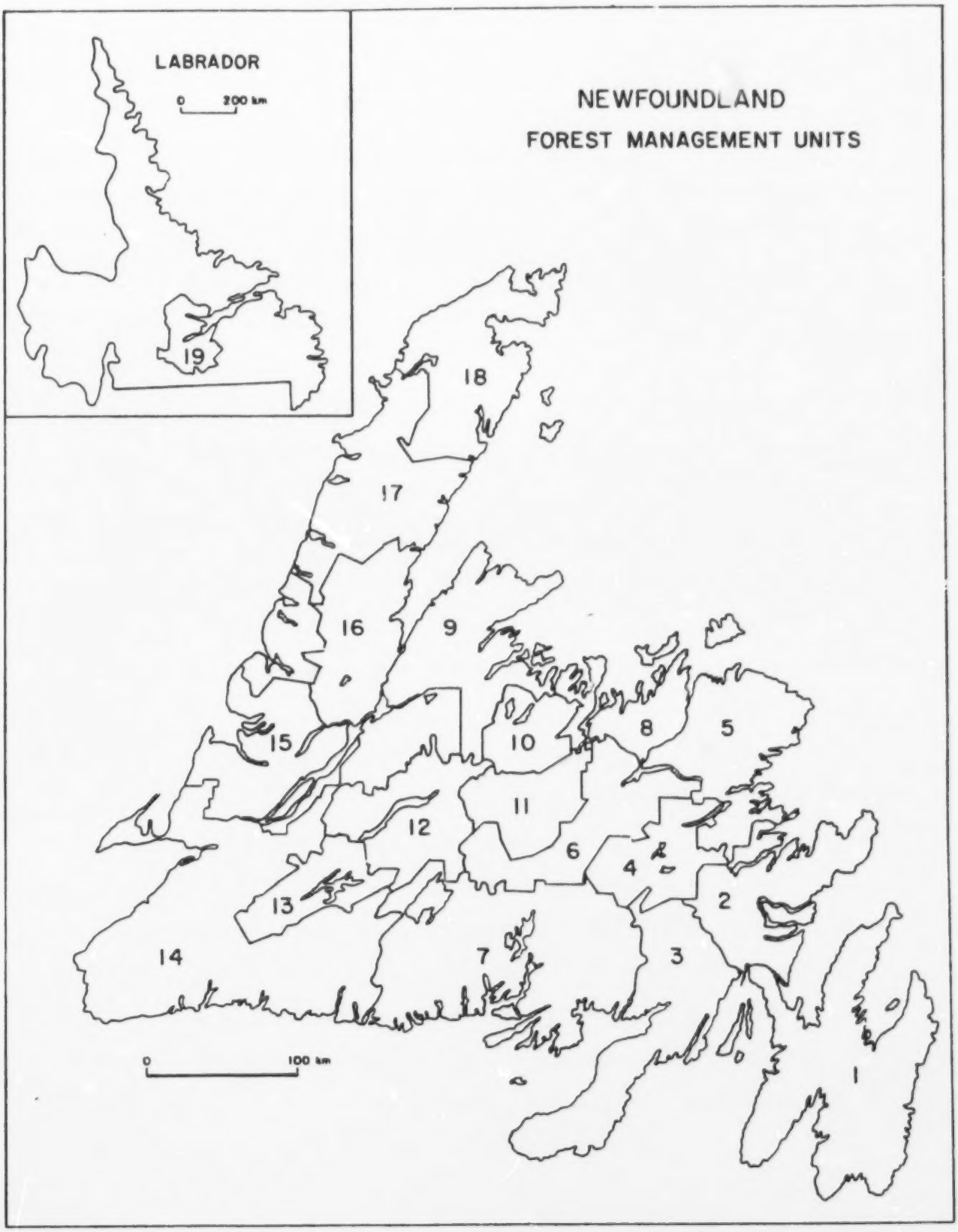

Figure 2. Newfoundland Forest Management Units.

Armillaria root rot was still the most important tree disease in black spruce stands in central Newfoundland. Scleroderris canker of pines continued to cause damage on ornamental pines in St. John's and along the Salmonier Line. Needle rust of several species of spruce was the most severe and widespread ever recorded on the Island.

Aerial surveys were conducted in fixed-wing aircraft and in helicopters in the productive forests of Newfoundland and Labrador to map defoliation, damage and collect branch samples to forecast the hemlock looper, spruce budworm and other pests for 1986. Approximately 50 hours were flown during aerial surveys and 216 hours during egg sampling and monitoring of looper population. Special surveys and studies were conducted on the black spruce decline plots, testing of chemical and biological insecticides on the hemlock looper, testing new sampling techniques developed for forecasting hemlock looper populations, testing spruce budworm, gypsy moth and forest tent caterpillar pheromone traps, sampling balsam woolly aphid populations in thinned forest areas and monitoring the introduced shrew in four permanent plots throughout the Island.

Acid rain plots established in 1984 throughout the Island were monitored this year and the information collected, analyzed and computerized for future references.

In 1985, an additional plot was established near Gull Pond in central Newfoundland in conjunction with a research study being conducted in that area by the Department of Fisheries and Oceans.

SPRUCE AND FIR PESTS

Eastern Hemlock Looper, Lambdina fiscellaria fiscellaria (Guen.) - The area of moderate and severe defoliation forecast for 1985 on the Island was about 273 000 ha with an additional 437 000 ha in the light category. Larval surveys conducted during the summer showed a decrease in looper population levels from Red Indian Lake to New Bay in central Newfoundland and from Markland to Holyrood in eastern Newfoundland. The reason for this decrease include relatively poor larval development in immature balsam fir and in black spruce stands especially in central Newfoundland and the occurrence of fungal disease in the older parts of the outbreak. In addition there was a poor correlation between looper numbers and subsequent defoliation and the area of severe defoliation was also reduced by the application of insecticides by the Department of Forest Resources and Lands. The aerial survey conducted in September recorded about 51 762 ha of moderate and severe defoliation on the Island distributed mainly on mature forests in the upper river valleys in western Newfoundland and near Lloyds River, Bay d'Espoir, Twin Lakes and Gander Lake in central Newfoundland and in Terra Nova National Park and on the Avalon Peninsula in eastern Newfoundland (Fig. 1). Light defoliation occurred on about 79 000 ha distributed mostly in isolated areas throughout western Newfoundland and in scattered locations in central and eastern Newfoundland (Fig. 3, Table 1).

Early spring and summer weather conditions were seasonably warm and sunny throughout most of the Island except along the south coast where

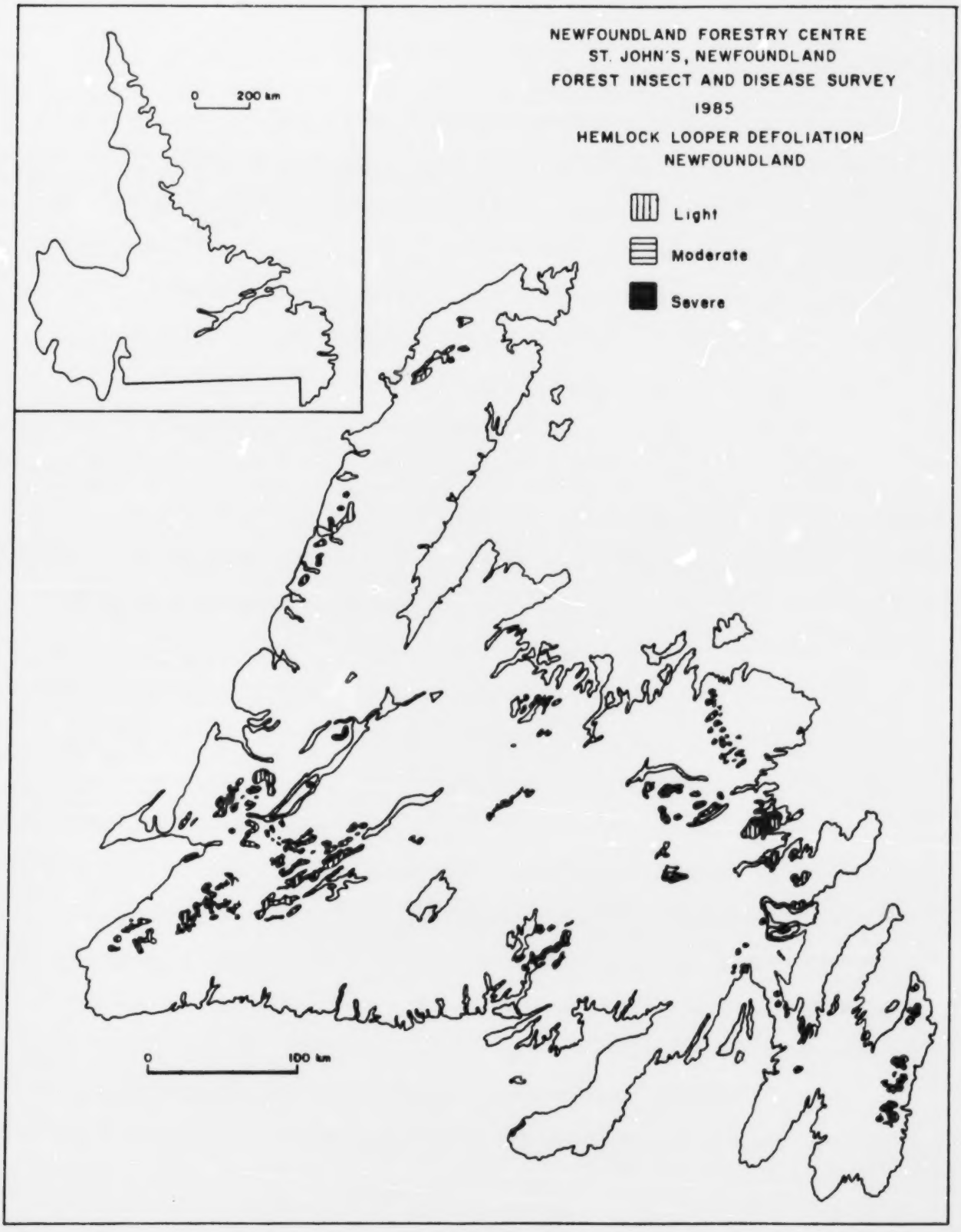

Figure 3. Areas of defoliation by the hemlock looper in Newfoundland in 1985.

Table 1. Areas (ha) of defoliation by the hemlock looper forecast in productive forests of Newfoundland in 1985.

Management Unit No.	Defoliation Class[1]			
	Light	Moderate	Severe	Total
1	4 206	-	5 942	10 148
2	5 511	-	4 160	9 671
4	-	-	680	680
5	3 022	-	7 060	10 082
6	4 799	68	3 287	8 154
7	506	-	238	744
10	2 281	-	5 728	8 009
11	965	-	3 717	4 682
12	578	-	1 477	2 055
13	503	-	330	833
14	13 896	51	3 212	17 159
15	19 883	1 989	9 167	31 039
16	12 974	1 057	68	14 099
17	5 492	-	-	5 492
18	1 416	-	-	1 416
Sub-total	76 032	3 165	45 066	124 263
TNNP	2 718	-	3 531	6 249
GMNP	245	-	-	245
Grand Total	78 995	3 165	48 597	130 757

[1]Light 1-25%.
Moderate 26-75%.
Severe 76-100%.

where fog and cool temperatures occurred. Mid to late summer was wet with seasonable temperatures but with high relative humidity. Warm and dry conditions occurred in late September and October in most areas on the Island and Labrador.

The Department of Forest Resources and Lands conducted an operational control program in July against the hemlock looper and treated about 136 300 ha with Fenitrothion and about 2400 ha with Bacillus thuringiensis (B.t.) for a total of 138 700 ha.

The Canadian Forestry Service in cooperation with the Department of Forest Resources and Lands conducted an experimental program testing the effectiveness of Matacil, Fenitrothion, B.t. and Dimilin against the looper. The results of these experiments showed that the B.t. formulation Thuricide 64B and an insect growth regulator, Dimilin, gave better control of the hemlock looper than Matacil^{R} and a new formulation of Fenitrothion.

Most of the work on the assessment of the biological mortality factors was concentrated in the older part of the outbreak near Bay d'Espoir and on the Avalon Peninsula.

Less than 1% of the larval samples were parasitized and the parasites recovered were 37% braconids, 38% ichneumonids and 25% of parasite larvae died before pupating. Of the pupal parasites recovered, 7% were ichneumonids, 43% were chalcids and 50% were tachinids. About 4% of the larval samples were infected by a fungus, Entomophaga aulicae. Most of the infection was detected in samples collected during late July when

the larvae were mainly in the fourth instar. About 21% of the pupal samples were also killed by the fungus E. aulicae.

No significant tree mortality was caused by the looper until 1985, the third year of the outbreak. Tree mortality became evident in 1985 in the older parts of the outbreak near Twin Lakes, Bay d'Espoir and Lake St. John in central Newfoundland and near Long Harbour on the Avalon Peninsula. The proportion of tree mortality varied from 2% to 10% in these areas. The Department of Forest Resources and Lands will assess the volume of damage at the inventory level.

The egg survey was delayed because of significant moth emergence, mating and oviposition continued until late October. Branches were collected from 668 sample points throughout the Island. Based on the egg counts on these branches and the distribution of larval populations in 1985 moderate and severe defoliation is forecast to occur on about 219 000 ha in 1986 distributed in four major areas in western Newfoundland and in several smaller areas in central and eastern Newfoundland (Fig. 4, Table 2). Some stands where severe defoliation occurred in 1985 in central and eastern areas are forecast to be in the light category in 1986. Light defoliation is expected to occur on about 693 000 ha throughout the Island. The egg density was very low (one egg per branch sample) in about 164 700 ha of this forecast category and defoliation may not become evident in these areas.

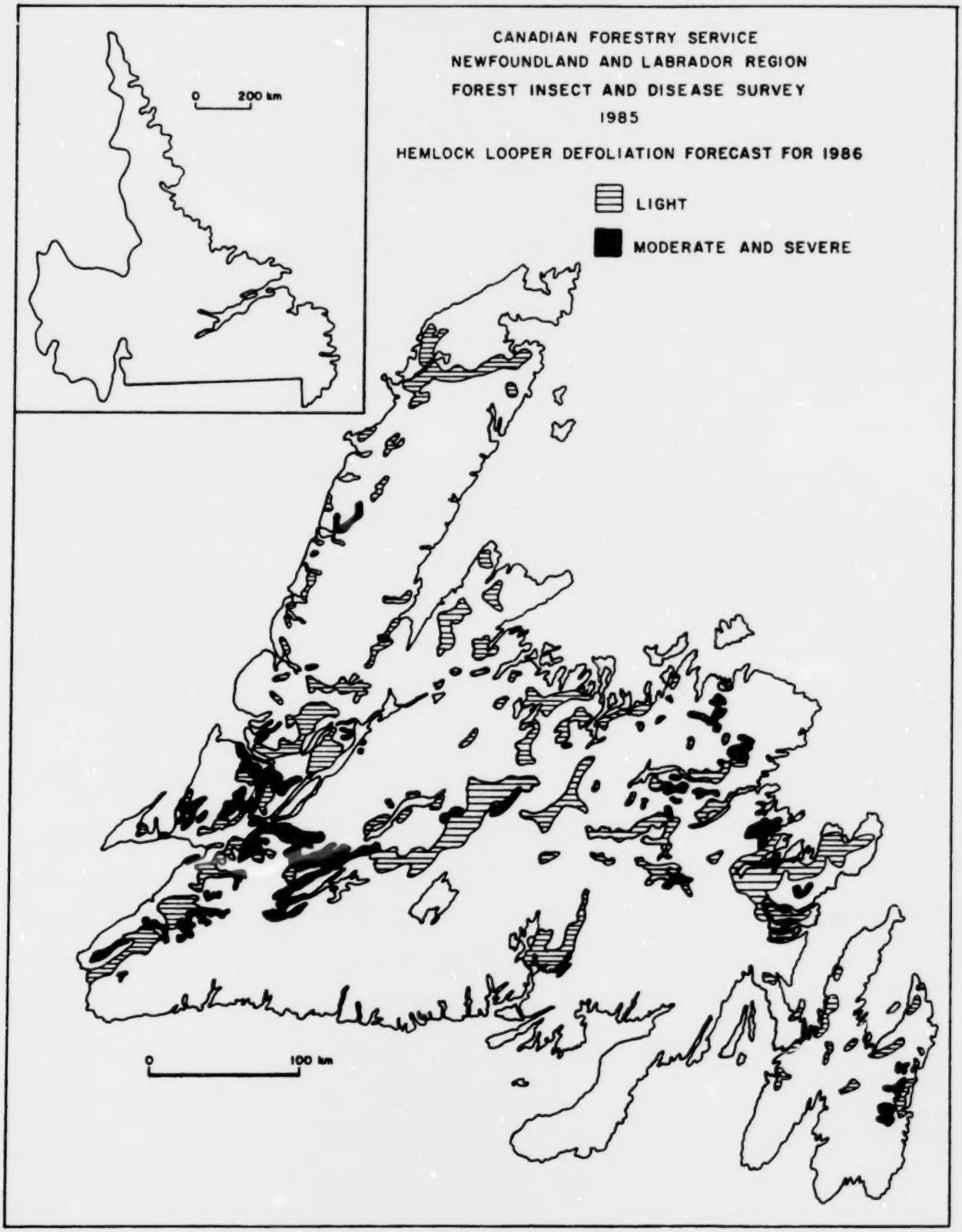

Figure 4. Areas of defoliation by the hemlock looper forecast in Newfoundland for 1986.

Table 2. Areas (ha) of defoliation by the hemlock looper forecast in the productive forests of Newfoundland for 1986.

Management Unit No.	Defoliation Class[1]			
	Light[2]	Light[3]	Moderate[4] and severe	Total
1	7 000	34 500	13 300	54 800
2	10 700	62 600	8 600	81 900
4	3 900	31 000	3 500	38 400
5	3 700	14 100	15 300	33 100
6	5 300	22 000	10 600	37 900
7	5 100	20 500	2 300	27 900
8	5 600	17 300	-	22 900
9	36 200	17 000	-	53 200
10	13 300	17 000	1 300	31 600
11	7 100	53 300	3 900	64 300
12	16 600	34 400	6 900	57 900
13		2 800	34 300	37 100
14	9 800	70 500	62 700	143 000
15	4 000	62 100	42 000	108 100
16	6 000	22 300	-	28 300
17	10 100	16 400	4 500	31 000
18	18 900	18 900	-	37 800
Total	163 300	516 700	209 200	889 200
TNNP	1 400	5 600	8 500	15 500
GMNP	-	6 000	1 000	7 000
Grand Total	164 700	528 300	218 700	911 700

[1]Light 1-25%
Moderate 26-75%
Severe 76-100%

[2]Areas with very low egg density (1 egg/branch).

[3]Areas with low egg density (2-3 eggs/branch).

[4]Areas with moderate and high egg density (4 or more eggs/branch).

Spruce Budworm, Choristoneura fumiferana (Clem.) - The total area of light, moderate and severe defoliation forecast on the Island for 1985 was about 63 000 ha with about 29 300 ha in the moderate and severe category. However the decreasing outbreak virtually collapsed in 1985. The area of defoliation in 1985 was about 3500 ha, with 3000 ha in the light and 500 ha in the moderate and severe category; a decrease from the 7300 ha of light and 15 300 ha of moderate and severe defoliation recorded in 1984. The defoliation was distributed in isolated areas mainly in western Newfoundland near South Branch, Seal Cove and Wild Cove on the Baie Verte Peninsula and along Noel Paul's Brook in central Newfoundland (Fig. 5, Table 3). There was no defoliation recorded in Labrador in 1985.

Table 3. Areas (ha) of defoliation caused by the spruce budworm in productive forests of Newfoundland in 1985.

Management Unit No.	Defoliation Class[1]			
	Light	Moderate	Severe	Total
9	1 782	170	-	1 952
12	734	-	272	1 006
14	102	-	-	102
16	408	-	-	408
Total	3 026	170	272	3 468

[1]Light 1-25%
Moderate 26-75%
Severe 76-100%

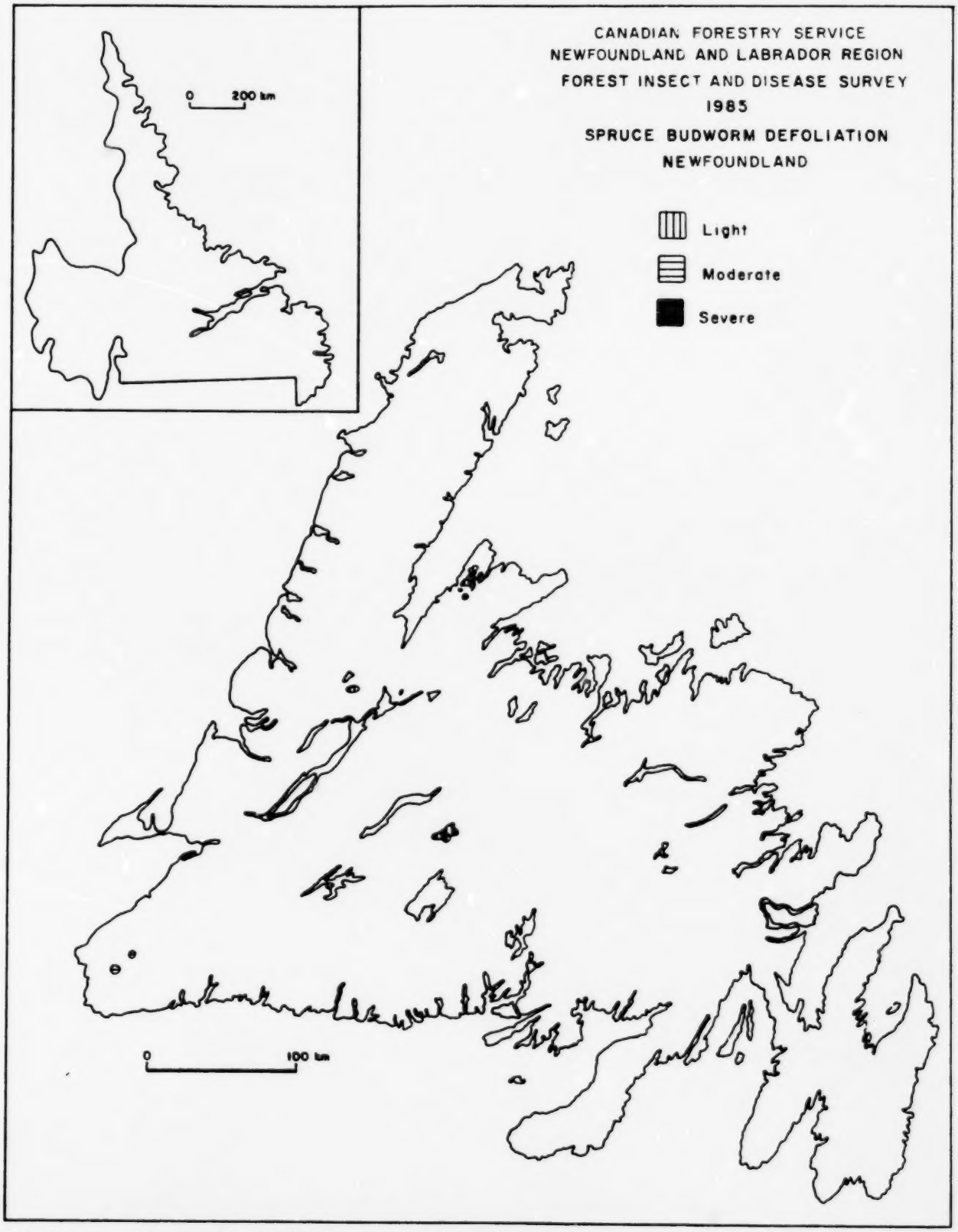

Figure 5. Areas of defoliation by the spruce budworm in Newfoundland in 1985.

Sex pheromone traps distributed throughout the Island in 1985 showed a large number of moths collected in traps near Sally's Cove on the Northern Peninsula and near Grand Lake in western Newfoundland (Fig. 6). It was not determined if the moths represented flights from mainland Canada or a buildup of local populations.

The Provincial Department of Forest Resources and Lands conducted an aerial control program of the budworm and treated 3450 ha with Bacillus thurigiensis.

In 1985, samples of spruce budworm were collected from several areas across the Island. The major larval parasites were Apanteles fumiferanae, Glypta fumiferanae and a tachinid species. The major pupal parasite was Phaeogenes hariolus. About 17% of spruce budworm samples were parasitized.

Fungal pathogens caused about 1% mortality of the reared budworm samples. The major fungal pathogens were Paecilomyces farinosus. Other fungal pathogens detected were Entomophaga aulicae and a single incidence of Hirsutella gigantea. E. aulicae was recovered from late instar larvae (L_5-L_6) and pupae. Incidence of microsporidian disease, caused by Nosema fumiferanae, was less than 1% and recovered only from samples collected from one location.

Egg and overwintering larval samples were collected in conjunction with the egg survey of the hemlock looper in late October. Results of this survey showed that no moderate and severe defoliation is expected for 1986 on the Island (Table 4). Light defoliation is forecast

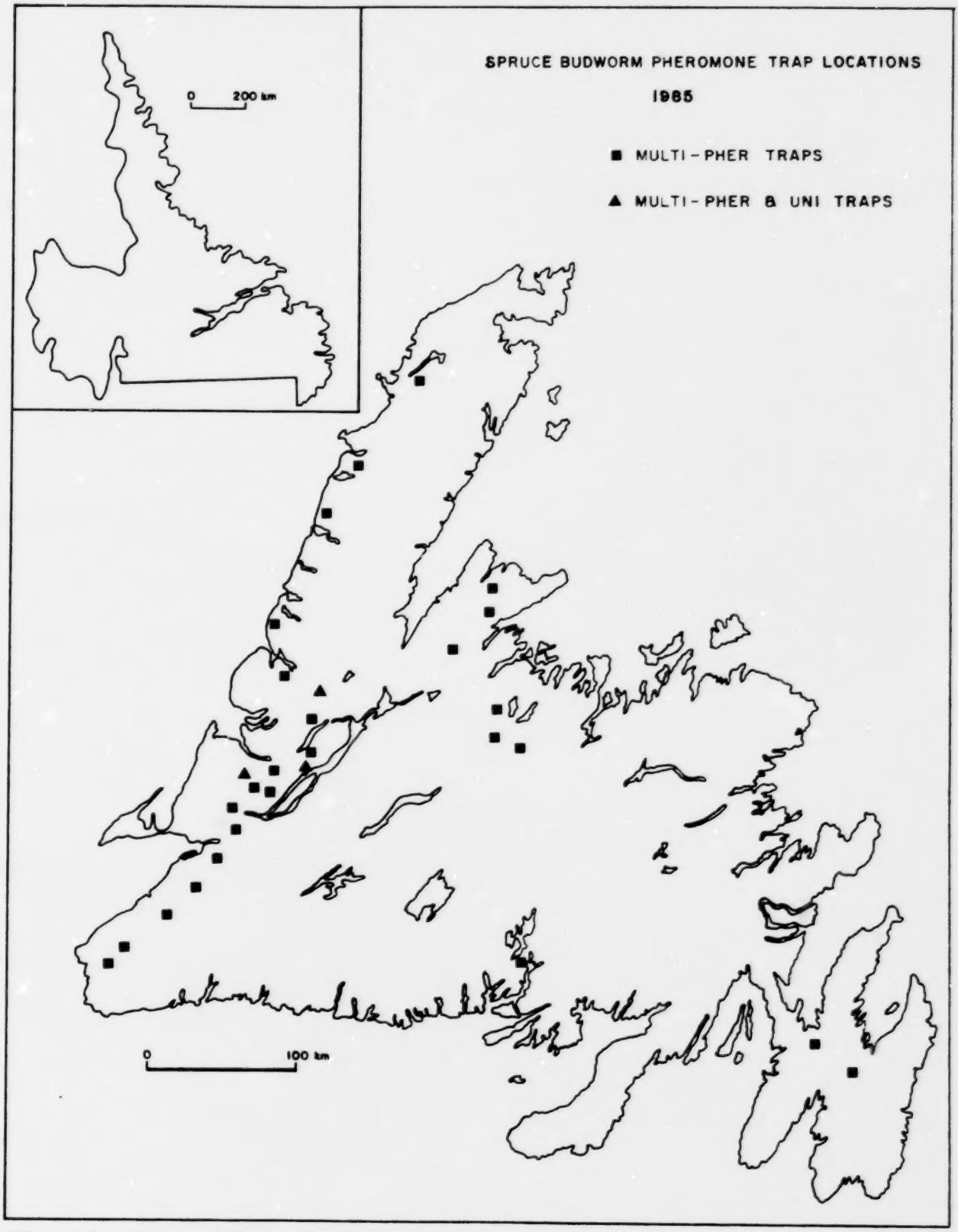

Figure 6. Spruce budworm pheromone trap locations.

Table 4. Summary of spruce budworm eggmass numbers per 10 m^2 of foliage for eggmass points with moderate and severe defoliation forecast in Newfoundland from 1978 to 1985.

	Moderate Defoliation Forecast*		Severe Defoliation Forecast*	
Year	Number sample points	Average EM/10 m^2	Number sample points	Average EM/10 m^2
1985	0	0	0	0
1984	2	157	1	321
1983	4	117	4	301
1982	10	147	7	379
1981	4	129	4	440
1980	49	149	123	437
1979	65	149	149	438
1978	72	154	124	491

*Class limits for defoliation forecast based on eggmasses per 10 m^2 of foliage.

Defoliation forecast	
Nil	0%
Light	1-25%
Moderate	26-75%
Severe	76-100%

to occur on about 7460 ha distributed in four widely isolated areas, three in the west coast of the Island and one in central Newfoundland (Fig. 7, Table 5). The stands in which heavy moth activity was observed near pheromone traps are included in the forecast for light defoliation.

Balsam Woolly Aphid, Adelges piceae (Ratz.) - Surveys conducted during the past three years showed that in western Newfoundland aphid damage has increased from Port aux Basques to Roberts Arm, along the coastline of Notre Dame Bay and from Badger to Gander Bay in central Newfoundland.

The recently increased damage is of major concern to forest managers as it also affects fir stands thinned at considerable financial cost to accelerate wood volume production. The enhanced volume production is considered essential to maintain the wood supply following major forest losses caused by the recent spruce budworm damage. In 1985 plots were established in forest improvement areas in western Newfoundland. Trees were tagged and classified for damage and branch samples were taken to estimate aphid population levels. Both the severity of damage and the average number of aphids per branch node increased noticeably in the thinned stands. Also, 80% of the trees in unthinned stands showed symptoms of aphid attack and 99% of the trees in thinned stands. Presently there is no effective practical control methods against the balsam woolly aphid other than the application of the hazard rating system in silvicultural and forest management activities to manage the aphid problem. Accordingly, stands at high aphid hazard should not be scheduled for thinning

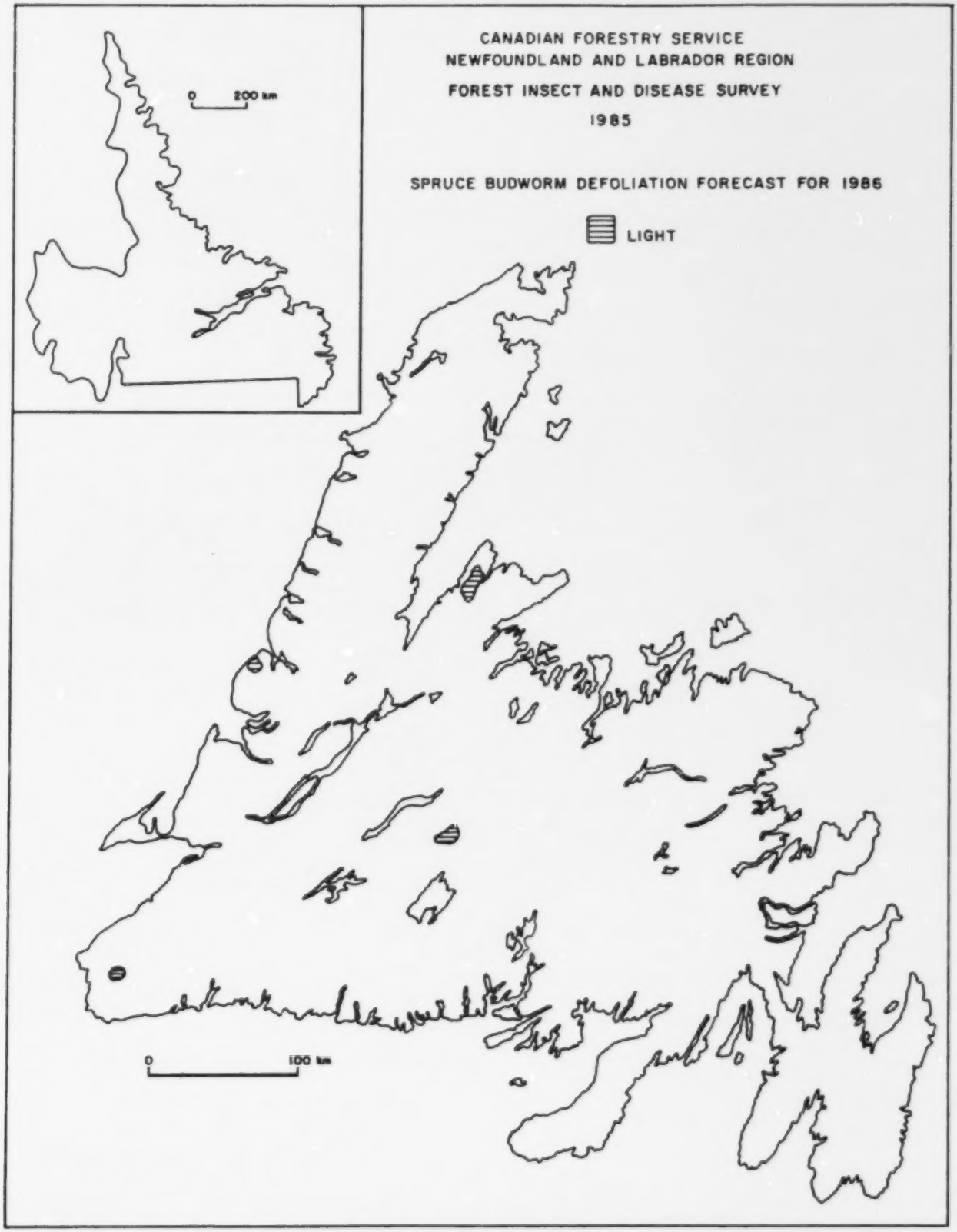

Figure 7. Areas of defoliation by the spruce budworm forecast in Newfoundland for 1986.

Table 5. Areas (ha) of defoliation by the spruce budworm forecast in the productive forests of Newfoundland for 1986.*

Management Unit No.	Ownership	Defoliation Class[1] Light	Total
9	Corner Brook P & P	5 483	5 483
12	Abitibi-Price	1 645	1 645
14	Corner Brook P & P	165	165
17	Crown	165	165
All	Crown	165	165
	Corner Brook P & P	5 648	5 648
	Abitibi-Price	1 645	1 645
Total		7 458	7 458

*Forcast based on eggmass and overwintering larval surveys.

[1]Light 1-25%
Moderate 26-75%
Severe 76-100%

and stands at lower hazards may be considered for thinning less intensively than those at little or no hazard.

The Canadian Forestry Service is planning to expand its research activities on the balsam woolly aphid problem including the redefinition of the hazard zones, the assessment of populations and damage on growth in relation to thinnning and other silvicultural treatments and the renewed search for a viable, environmentally acceptable, direct control method.

Four-eyed Spruce Bark Beetle, Polygraphus rufipennis (Kby.) - Tree mortality associated with this beetle and Armillaria root rot in mature black spruce stands previously defoliated by the spruce budworm decreased again in 1985 to an average of 3.2% from 4.5% in 1984 and 8.7% in 1983. The corresponding decrease in immature spruce stands are 1.2% in 1985, 2% in 1984 and 5% in 1983. Again in 1985 trees in the 20-90% defoliation categories were successfully attacked by this beetle. Also in young stands where only 1.2% of the trees died, trees with various degrees of damage were successfully attacked. However, large areas of dead and dying black spruce stands still remain in the Upper Nortwest Gander River area and along the Bay d'Espoir Highway between the mouth of Miquels Brook and Little Gull Pond in Upper Southwest Gander River near Dennis brook, between Jumpers Brook and Rattling Lake, near Wooddale Nursery, Junction Brook near Badger, Powderhorn Lake, Sops Lake to Tommy's Arm and Nutmeg Hill to Three Corner Pond (Halls Bay).

The decrease in the rate of black spruce mortality from 1984 to 1985 is consistent with other observations of declining bark beetle activity and possible complete recovery of surviving spruce trees.

Needle Rust of Spruce, Chrysomxa ledicola Lagerh. and C. empetri Schroet - Needle rust of several species of spruce was very conspicuous all across the Island. High incidences of the disease were recorded in eastern Newfoundland at St. Catherines, Ferryland and along the Trans Canada Highway from Long Harbour to St. John's. Infection occurred on 80% of black and white spruce affecting up to 80% of the new foliage. A severe incidence of needle rust also occurred on black spruce in central Newfoundland from Gander to Bay d'Espoir. Approximately 90% of the spruce trees were affected and 80% of the new foliage had turned yellow. This year this disease was the most severe and widespread ever recorded on the Island. The disease was also present on Colcrado blue spruce in private gardens in St. John's, Harbour Grace and Carbonear. In a plantation near Mobile up to 50% of the foliage was affected on 95% of the black and Sitka spruce trees.

Armillaria Root Rot, Armillaria mellea (Vahl. ex Fr.) Kummer - This root rot was recorded in a black spruce plantation at South Pond on a burned-over area in central Newfoundland and caused up to 10% mortality. Black spruce and balsam fir trees were also examined near Joe Batt's Pond west of Gander for Armillaria root rot, and 10% of the fir and 5% of the black spruce were infected. This area had a previous history of insect damage both by the spruce budworm and the four-eyed spruce bark beetle. The disease was also recorded on Scots pine at the Pasadena Nursery.

Inland Spruce Cone Rust, Chrysomyxa pirolata Wint. - Cone rust of black spruce occurred on a regeneration site near Swift Current. Up to 40% of

the cones on 5% of the trees were affected. A low incidence of the disease also occurred on black and white spruce near Pouch Cove on the Avalon Peninsula.

Eastern Dwarf Mistletoe Arceuthobium pusillum Pk. - Surveys of witches' broom of black spruce showed that dwarf mistletoe continued to spread in a black spruce stand near Gambo. The incidence nearly doubled from the previous year. Up to four brooms had formed on some of the newly parasitized trees. The newly formed brooms from the previous year had grown larger as the plant parasite progressed.

Spruce Beetle, Dendroctonus rufipennis (Kby.) - Populations of the spruce beetle were at or near the endemic level in 1985. Very few scattered recently killed trees were seen in the Corner Brook area and no beetle activity occurred in other areas of previous infestations.

Winter Drying - Winter drying continued to be very common and severe throughout the Island. A high incidence occurred on balsam fir on the Northern Peninsula near the Zinc Mine Road. A, moderate incidence was recorded near Sally's Cove and Bellburns where up to 60% of the fir trees were affected. In and around St. John's, pine spruce and fir were severely affected with up to 70% of white spruce showing symptoms. Other areas where high to moderate incidence were recorded include Mount Pearl Experimental Farm, Wooddale Nursery, Ocean Pond, Long Harbour, Crescent Lake and Pasadena Nursery. A low incidence was observed at St. Phillips.

PINE AND LARCH PESTS

Scleroderris Canker of Pines, Gremmeniella abietina (Lagerb.) Morelet (European Race) - Scleroderris canker continued to spread on ornamental pines in St. John's. New infections were recorded on Austrian pine throughout several areas in the city. About 60% of the trees were infected and up to 30% of the shoots showed symptoms. Many of the infected trees were pruned in an effort to eradicate this canker disease or reduce its spread. Inspection of the site on the Salmonier Line, outside of the quarantine area, where infected trees were removed in 1984 showed no new symptoms of infections.

Surveys for the presence of Scleroderris canker were also conducted in pine plantations and ornamental trees across the Island and no new infections were recorded outside St. John's.

Larch Sawfly, Pristiphora erichsonii (Htg). - Population levels were high from Goulds to Mount Pearl, near Windosr Lake, St. Phillips to Topsail and near New Harbour, Trinity Bay. This is the second year of defoliation for many areas and trees were severely defoliated.

Shrew trapping was conducted in three of the four plots across the Island in October. Results of this trapping are summarized in Table 6.

Larch Beetle, Dendroctonus simplex Lec. - Infestations of the eastern larch beetle, further decreased in size in 1985. Population levels are near endemic levels in all infestations except in a few stands south of Gander Lake where scattered groups of living larch trees were killed by this beetle.

Table 6. Estimated number of shrews per hectare in Newfoundland.

Location	Year of Estimates				
	1981	1982	1983	1984	1985
St. George's	12.69	4.30	10.77	2.15	3.21
Hall's Bay	4.83	6.45	4.30	6.45	3.21
Terra Nova	7.53	8.60	4.30	10.80	-*
Paddy's Pond	2.15	5.39	3.24	5.39	2.15

*Not done in 1985.

Needle Cast of Conifers, Lophodermium pinastri (Schrad. ex Hook) Chev. - Dothistroma needle cast was recorded on Austrian pine in the arboretum near Bottom Brook. Up to 70% of the foliage was affected on some trees. A moderate incidence of lophodermium needle cast of Jack pine was observed in a plantation near Tilton. Up to 30% of the needles were affected.

Pinewood Nematode, Bursaphelenchus xylophilus (Steiner and Buhrer) Nickle - A plant parasitic nematode originally found to cause a fatal wilt disease pines has been recorded in many parts of the United States and recently in Manitoba. Most recent studies also found this parasite to affect fir, spruce, larch and cedar as well. Some European countries have established a quarantine program in an effort to prevent the introduction of the diseaseof to Europe. The disease has not been recorded in Newfoundland and in 1985 the Forest Insect and Disease Survey in cooperation with Memorial University of Newfoundland conducted a Province-wide survey to determine the status of this pest.

Wood samples from healthy, damaged and recently dead trees of all softwood species were collected throughout the Island and Labrador. The processing of samples and identification of nematodes isolated are still in progress, but to date the pinewood nematode has not been found.

DECIDUOUS TREE PESTS

Birch Casebearer, Coleopohora serratella (L.) - Population levels of the casebearer were extremely high for the third consecutive year throughout eastern Newfoundland including the Avalon Peninsula. Damage of white birch stands was severe throughout the Terra Nova National Park and the Avalon Peninsula and on ornamental trees in the St. John's area.

White-marked Tussock Moth, Orgyia L. leucostigma J.E. Smith - A severe infestation of this insect occurred near a plantation along the Bottom Brook woods road in western Newfoundland. Approximately 100 ha of white birch, speckled alder and other hardwoods were severely damaged. Light damage occurred on balsam fir and white spruce. This insect also caused severe damage to black spruce and larch seedlings in the plantation although only a small area was attacked. The Department of Forest Resources and Lands treated the area with B.t. (Bacillus thuringiensis) to control the infestation. A fungal disease by Entomophthora sp. was also found to cause larval mortality. Plans are being made to treat the area with virus spray if infestations persist in 1986.

Mountain Ash Sawfly, Pristiphora geniculata (Htg.) - Population levels of the sawfly were again high on the Avalon Peninsula particularly in St. John's and surrounding areas. Damage to ornamental trees was common in many areas as the insect has no widespread natural enemies. In 1981 a parasite was introduced from Quebec and released near the Oxen Pond Botanic Park and three other locations in St. John's to initiate biological control of this pest. Dissection of host larvae collected at the Ocean Pond Botanic Park showed the presence of larvae of the introduced parasites. This is the first indication of its establishment.

Striped Alder Sawfly, Hemichroa crocea (Geoff.) - Population levels of this sawfly continued to increase for the third consecutive year. Severe defoliation of alder, birch and willow occurred throughout most of the Island. The most noticeable damage of roadside shrubs occurred throughout the Terra Nova National Park, along roads on the Bonavista Peninsula and along the Hall's Bay Road near Gullbridge Mines.

Willow Blight, Fusicladium saliciperduml (All. Tub.) Lind. and Physalospora miyabeana Fuk. - Willow blight continued to be a problem on ornamental willows throughout the Island. A high incidence of the disease occurred in Gambo causing severe damage and mortality of golden willow. Over 90% of the trees showed symptoms of the disease with up to 95% of the foliage affected. Near Topsail, 100% of the laurel willow were infected with up to 30% of the foliage affected. In Gander, St. John's and Mount Pearl ornamental willow trees were also severely damaged by this disease.

Shoot and Leaf Blight of Trembling Aspen, Venturia macularis (Fr.) E. Muel to Arx. - A high incidence of the disease was recorded along the Baie Verte Highway, Hampden Junction and the Deer Lake Highway. The roadside trembling aspen trees had 80% of the foliage affected. A moderate incidence occurred at Aspen Brook Provincial Park in central Newfoundland.

Fall Webworm, Hyphantria cunea (Drury) - Population levels have increased in the past two years in the Stephenville Crossing - White's Road area. Introduced accidentally to the Province in 1951 the webworm has remained in the same general area and has caused no serious damage to forest stands.

Mourning-Cloak Butterfly Nymphalis antiopa (L.) - Population levels of this insect were high along roads in the Spruce Brook and Gallants areas and on ornamental willow trees in Corner Brook. Severe defoliation of willow and aspen were common along woods roads and in several gardens in the city. This pest causes severe defoliation of shade trees but feeding is confined to a single branch at a time and is easily controlled.

Leaf Spot of Hardwoods - Septoria leaf spot was recorded on 100% of balsam poplar trees at the Crabbes River Provincial Park. Up to 10% of the foliage was affected with some dieback also occurring. Cylindrosporium leaf spot of white birch occurred at Swift Current where up to 80% of the foliage was affected on most of the young trees. Large leaf spot of mountain maple was observed at Crabbes River Provincial Park where 50% of the trees were infected and up to 80% of the foliage affected.

Forest Tent Caterpillar, Malacosoma disstria Hbn. - Surveys conducted in cooperation with the Plant Health division of Agriculture Canada were continued in 1985. Pheromone traps were located in camping grounds and near towns along the west coast and other major towns throughout the Island. A total of three male moths were trapped in the Gros Morne National Park.

Gypsy Moth, Lymantria dispar (L.) - A survey was again conducted in 1985 in cooperation with the Plant Health Division of Agriculture Canada to monitor any accidental introduction of this pest to the Province. Pheromone traps placed in camping parks and near major towns captured only one male moth in Mummichog Provincial Park in western Newfoundland. This is the first record of this species on the Island.

OTHER INSECTS AND DISEASES

Insects and Disease	Host(s)	Location	Remarks
Acleris variana (Fern.) Eastern blackheaded budworm	Black spruce, White spruce, Balsam fir	Throughout Island	Low populations. Trace to light defoliation.
Apiosporina morbosa (Schw.) Arx Black knot	Pin cherry, Plum	Throughout Island	On the Avalon Peninsula 100% of ornamental plum trees showed severe infection with up to 80% of the twigs having black knots.
Bromius obscurus (Linn.) Western grape rootworm	Dogwood	Gallants	Low numbers and 20% defoliation.
Chrysomela mainensis mainensis Bech. Alder leaf beetle	Speckled alder	Western NF., Bread Cove Brk. (TNNP)	Low to moderate populations.
Cladora limitaria (Wlk.) Green balsam looper	Balsam fir	Western and eastern NF.	Low numbers. No significant defoliation.
Coccomyces hiemalis Higgins Shot hole of cherry	Pin cherry	Swift Current	Up to 50% of foliage affected.
Coleophora laricella (Hbn.) Larch casebearer	Tamarack, Japanese larch	Mollychignic Brk., Pasadena nursery, Hopeall	Moderate populations. Up to 50% branches affected on Japanese larch at Pasadena.

Cont'd. ...

Other Insects and Diseases (Cont'd.)

Insects and Disease	Host(s)	Location	Remarks
Coleosporium asterum (Diet.) Syd. Needle rust	Jack pine	Tilton	Up to 10% foliage affected in plantation.
Coleotechnites piceaella (Kft.) Orange spruce needleminer	Balsam fir	Western NF., Avalon Peninsula	Low to moderate populations. No significant defoliation.
Dioryctria reniculelloides Mut. & Mun. Spruce coneworm	White spruce, Balsam fir	Pasadena nursery, S. of Hawkes Bay	Low numbers.
Fenusa dohrnii (Tischb.) European alder leafminer	Speckled alder	Western NF., Bread Cove Brk. (TNNP), Bay d'Espoir Rd.	Low to moderate populations. Defoliation ranged from 5% to 50%.
Feralila jocosa (Gn.) Redmarked caterpillar	Balsam fir	Western NF., Burgeo Rd. (5.6 km N. Lloyds River)	Low numbers.
Gilpinia hercynia (Htg.) European spruce sawfly	Black spruce, White spruce, Balsam fir	Western NF.	Low populations and no significant defoliation.
Hylobius sp. Root collar weevil	White spruce	Avalon Peninsula	Low numbers found on Salmonier Line
Hyphantria cunea (Drury) Fall webworm	Speckled alder	Western NF.	Moderate populations and 20% defoliation recorded near Stephenville.

Cont'd. ...

Other Insects and Diseases (Cont'd.)

Insects and Disease	Host(s)	Location	Remarks
Kabatiella apocrypta (Ell. & Ev.) Arx Anthracnose	Mountain maple, Red maple	Western NF.	80% damage on 50% red maple trees in Crabbes River Prov. Park. 70% incidence on few trees near Roddickton.
Melampsorella caryophyllacearum Schroet. Broom rust	Balsam fir	Avalon Peninsula	Common and widespread with up to 30 brooms on 80% of the trees.
Mindarus abietinus Koch) Balsam twig aphid	Balsam fir	Western and central NF.	Low to moderate populations.
Nectria cinnabarina Tode ex Fr. Nectria canker	Mountain ash, Sycamore maple	Avalon Peninsula	Low incidence. Young maple affected.
Nematus limbatus (Cress.) Willow sawfly	Willow	Western NF., Avalon Peninsula	Moderate to high numbers. Light defoliation.
Neodiprion abietis Complex Balsam fir sawfly	Balsam fir	Western NF.	Low populations and no significant defoliation.
Nymphalis antiopa (L.) Spiny elm caterpillar	Willow, elm	Western NF.	High populations. 80% defoliation on one elm tree at Pasadena.

Cont'd. ....

Other Insects and Diseases (Cont'd.)

Insects and Disease	Host(s)	Location	Remarks
Orgyia antiqua (L.) Rusty tussock moth	Balsam fir, willow, Speckled alder, White birch,	Western and central NF., Avalon Peninsula	Low populations.
Phacidium infestans Karst. Snow blight	Black spruce, White spruce	Pasadena, Bay Roberts	Damage was patchy and occurred to approximately 50% of black and white spruce seedlings in Pasadena nursery.
Phyllocnistis populiella (Cham.) Poplar serpentine leafminer	Trembling aspen, Balsam poplar	Western NF., Aspen Brook Prov. Park	Low numbers and light defoliation.
Phyllosticta minima (Berk. & Curt.) Underw. & Earle Purple eye spot	Red maple	Burgeo Rd., CFS arboretum (Bottom Brook)	Up to 20% of the foliage affected on a few trees.
Pikonema dimmockii (Cress.) Greenheaded spruce sawfly	Black spruce, White spruce, Balsam fir	Western NF., Terra Nova Nat. Park, Forest Field (Salmonier)	Low numbers. No. significant defoliation.
Pollacia elegans Serv. Leaf and shoot blight	Balsam poplar, Silver poplar	Grand Falls, Paradise, St. John's	A moderate incidence occurred on 40 silver poplar trees in central Nfld. Low incidence elsewhere.
Pristiphora geniculata (Htg.) Mountain ash sawfly	Mountain ash	Western NF., Mount Pearl area	Moderate populations. Severe defoliation in Mt. Pearl area.

Cont'd. ...

Other Insects and Diseases (Concl'd.)

Insect and Disease	Host(s)	Location	Remarks
Pucciniastrum epilobii Otth Needle rust	Balsam fir	Western NF.	Low incidence. 5% of the foliage affected.
Rehmiellopsis balsameae Waterman Tip blight of balsam fir	Balsam fir	Mount Pearl	Moderate incidence recorded Agr. Canada Exp. Farm and at the Prov. Dept. of Forest Resources and Lands nursery.
Rhyacionia buoliana (D. & S.) European pine shoot moth	Scots pine	Pasadena	Low populations and a trace of damage in CFS nursery.
Septoria betulae (Lib.) West Leaf spot	White birch	Western NF.	30% of foliage affected on 80% of trees in CFS arboretum at Bottom Brook.
Taphrina populina Fr. Yellow leaf blister	Lombardy poplar	Avalon Peninsula	Trace to low incidence.